

A Cursory Ecological Survey of the Flora and Fauna of the Hazaribagh National Park (Bihar)

BY

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(With a map)

SYNOPSIS

An ecological survey of the Hazaribagh National Park in Bihar, carried out in two attempts, one from December 12 to December 22, 1959, and the other from January 8 to January 16, 1960, revealed a distinct correlation between forest types and the distribution of the fauna, in respect of both the larger animals and the birds. The survey was carried out by intensively sampling 20% of the area of the National Park in which all the forest types were represented. The results show that the population of both animals and birds is low; there being only some 60 species of birds and the larger mammals totalling about 300 individuals. In addition the fauna is very shy, and in spite of five years of protection has not shed its fear of man.

In the case of the Whitefaced Wagtail and the Blackheaded and Rufousbacked Shrikes, the sub-species can be easily separated in the field by sight alone. In these cases, therefore, trinomials have been used without specimens actually having been collected.

1. GENERAL

The idea of creating a National Park in Bihar was first mooted in December 1952, and the present site was tentatively suggested. This site at first was not considered ideal and several alternative sites were also explored. In the end, considering the factors of accessibility and the presence of a reasonable number of wild life, the present location was deemed to be the best. In 1953, therefore, a proposal was submitted to the State Government and the matter was also discussed at a meeting of the State Wild Life Board held in April 1954. In August 1954 the State Government issued an executive

order creating a sanctuary only, with the intention of eventually converting it into a National Park after the policy in respect of National Parks had been decided by the Indian Board for Wild Life. In the same order Government sanctioned staff comprising one Assistant Game Warden of the rank of a Forest Ranger and 10 Game Guards. 2 Foresters were also sanctioned at a later date. The Divisional Forest Officer of the Hazaribagh Forest Division was appointed as the Game Warden.

The policy in respect of National Parks was decided at the meeting of the Indian Board for Wild Life held at Calcutta in February 1955, and some time later the Board also circulated model legislation for National Parks. But no action at all was taken in Bihar in respect of this area. Even though in all official and non-official descriptions it is called a National Park, the actual position is that it is only a sanctuary created by executive order. It appears that not even the Forest Department have taken any steps to persuade Government to convert it into a full-fledged National Park by enacting legislation. Until that is done the legal position is rather precarious.

Though the carrying of arms into the area is forbidden there is no legal sanction behind this order, and if anybody refuses to hand over his arms the forest staff have no powers to enforce it. Again shooting in self-defence is permitted by the law even inside sanctuaries and it is a wonder that nobody has as yet taken advantage of this lacuna. Another shortcoming is the lack of visible demarcation of the limits of the Park at the spot. The boundary where it coincides with natural features or roads etc. is clear, but elsewhere it is not possible to find out where the limits are. I understand that, when planned, the idea was to fence it all round with barbed wire so as to limit ingress or egress to recognised gates, but this has not been done so far. Whilst barriers have been erected on all the roads leading into it from the National Highway, there is nothing to prevent a poacher from entering on a jeep at places away from these barriers.

2. LOCATION

The National Park is situated in the Hazaribagh district astride the Patna-Ranchi National Highway, between 7 and 11 miles (11 and 18 km.) from Hazaribagh town proceeding towards the Grand Trunk Road, which passes through Barhi, 22 miles (35 km.) north of Hazaribagh and 248 miles (400 km.) west of Calcutta. It comprises the old reserved forests of the Ramgarh Raj which were nationalised

under the Bihar Land Reforms Act. These forests cover an area of 77 square miles or 20,000 hectares approximately, and are completely free from any kind of right whatsoever. Though these were reserved forests, yet the Ramgarh Raja had extensive shoots for himself, his guests, and British V.I.Ps. At a later date live tigers were also trapped for sale. A tiger trap used in those days is still to be seen, but is maintained merely as a curiosity. In the result, though ordinary persons could not shoot in this area, yet heavy shikar by the owner himself led to a steady depletion of the fauna. Also, poaching by villagers was not very strictly controlled.

3. AMENITIES

After conversion into a sanctuary the Forest Department undertook large scale construction work. Today there are about 40 miles (64 km.) of motorable gravel roads traversing the entire area. There are also 3 dams for storing water since there is a shortage of water in the hot weather. 10 Watch Towers strategically located provide vantage points for observation. There are two Forest Rest Houses and a 4-roomed Tourist Lodge. The rents are Rs. 6 per room per day in the Forest Rest House and Rs. 4 in the Tourist Lodge. Though a khansama is provided no foodstuffs are available with him. If, however, the raw materials are supplied he can turn out a meal, though the standard of cooking is not very high. Intending visitors will be well advised to carry foodstuffs with them and not depend on local supplies. The tariff of meals hung up in the Tourist Lodge is completely misleading as not a single item mentioned on it can ever be supplied by the khansama. Bed linen, mattresses, pillows, mosquito nets, and towels are provided; visitors have to carry only blankets.

4. TOPOGRAPHY

The longest axis of the Park lies east and west and extends on either side of the National Highway. The maximum length is 16 miles or 26 kilometres and the average is between 12 and 13 miles (19 km. to 21 km.). The width varies considerably from a maximum of 6 miles (9.5 km.) in the middle just west of the National Highway to a minimum of $1\frac{1}{2}$ to 2 miles (2.4 to 3.2 km.) on both the eastern and the western extremities. Inside the Park itself there are few villages and none of them of any considerable extent, but the southwestern part over an area of approximately 9 to 10 square miles (2300 to 2900 hectares) is honeycombed with them.

Apart from this area there are also tiny patches of cultivation elsewhere, though none of them is more than an acre or two in extent. On the whole it is comparatively free from the dangers of illicit felling and poaching by villagers except on its fringes. In this connection it may be mentioned that the Government did not accept the proposal of the Forest Department to have a buffer zone 5 miles (8 km.) wide all along the boundaries of the Park and declare it a sanctuary.

The general slope lies from south to north, and both from the east and the west to the middle, the National Highway running through the trough of the area. The bench marks decrease from 1888 feet (575 m.) above sea-level at the boundary of the National Park in the south to 1511 feet (460 m.) at the northern end. The average slope from the east to the National Highway is greater, falling from over 1900 feet (575 m.) in the extreme east to the level of the Highway itself. West of the Highway the slope is not so marked and the watershed lies at approximately 1900 feet (580 m.) some 2 to 3 miles (3.2 km. to 4.8 km.) west of the Highway. From here the country slopes down to about 1750 feet (530 m.) and rises again to about 1900 feet (580 m.) in the extreme west. The highest point is a spot height 2086 feet (635 m.) above sea-level situated between the villages of Gurudih and Nachle in the extreme west approximately $8\frac{1}{2}$ miles (13.6 km.) from the National Highway.

The general direction of flow of almost all the streams is from south to north and there are no streams penetrating the watershed lying west of the National Highway. Two drainage basins lie on either side of this watershed and they both flow south for quite some distance before meeting at a gap on the northern boundary. East of the Highway the area is not so well watered and there are only two perennial streams which unite and give rise to the Tiger Falls just short of the northern boundary about 2 furlongs (400 metres) west of the Highway.

The underlying strata are mostly shales, which crumble and weather easily but do not give rise to a rich soil. Shales in Bihar are invariably associated with a poor site quality for *Shorea robusta* and therefore, even at its peak, this area is not capable of any crop better than good Quality III Sal. Correspondingly, at no time will it be possible for this area to have many soft-fruited trees. Villagers or contractors do not usually fell *Ficus* trees, but even today the Park is very short of them. I could not see a single mango tree throughout the area and there were very few *Madhuca latifolia*

(Mahua) trees as well. This may perhaps account for the comparative paucity of bird species. The odd *Ficus* tree where it occurs always attracts large mixed hunting parties. For example, a lone *Ficus glomerata* tree near the Forest Rest House was always teeming with barbets, bulbuls, parakeets, and others.

The area has not been sub-divided into blocks and compartments, which renders locations extremely difficult to describe. The only fixed points are the roads and watch towers, and using them as reference points has not been found to be very satisfactory, but in the circumstances is the only way available for the purpose.

5. ECOLOGY

The forest type is B-3 Dry Peninsular Sal according to the classification of Champion with the general conditions more xerophilous. As a matter of fact there is a complete absence of evergreen species and even along the streams no evergreen patches exist. *Terminalia* trees are rather scarce and no *Michelia champaca* or *Anthocephalus cadamba*, the usual moist associates of Sal, were seen.

The Sal crop itself is entirely in the pole stage and no trees of 4 feet (1.21 m.) girth or above exist. The crop itself is remarkably uniform in age and averages 30-40 years. It appears to be the result of heavy selection fellings as there is no record of this area having been subject to extensive shifting cultivation within the last 50 years. In fact Hazaribagh district as a whole was never subject to shifting cultivation in a large degree at any time.

Due to the immature nature of the crop estimation of quality classes proved difficult, but the northern aspects carry a good Quality III crop whereas the southern aspects carry a poorer crop. The usual associate of Quality I Sal, *Clerodendrum infortunatum* was not seen at all.

The associates of Sal vary very widely, and even within a small area showed remarkable changes. Thus on the road leading from Watch Tower 4 to 5 the southern aspects had a very large proportion of *Boswellia serrata* (Salai) forming at places practically pure patches. Signs of heavy grazing in the past are provided by the presence of *Nyctanthes arbortristis* (Harsinghar). The northern aspects on this road have a large number of bushes of *Flemingia chappar*, indicative of a good site quality for Sal. In this area too the stream banks carry some *Eugenia heyneana* (Kat Jamun).

On the other hand along the Bahimar road the proportion of *Boswellia serrata* is very low, even on the southern aspects.

Generally speaking the conditions are more tropophilous than on the other road and *Bauhinia vahlii* is rather common, forming at places a pure bushy undergrowth.

The third road is the one leading from the Forest Rest House to the National Highway. Here the forest is a blend of the other two types described above, but on the whole tending towards xerophilous conditions. *Boswellia serrata* is present in much smaller numbers and there is an increase in the number of *Acacia catechu* (Khair) trees. Elsewhere the *A. catechu* is very isolated but here it can be found in small groups forming an association. Remarkably enough, however, the only large stream flowing here carries large numbers of *E. hyneana* both along the banks and on the islands.

The Sal appears to be in the stage of a precarious climax, the condition being comparable to that obtaining in the Baresand Block of the Palamau Forest Division though neither the flora nor the fauna is as rich as in that block. Here also any large scale opening of the canopy leads to a heavy invasion by *Heteropogon contortus* (Spear grass), completely inhibiting Sal regeneration and smothering any advance growth that is present. This is nowhere more evident than on the view strips being cut along the roadsides, where the fellings are almost in the nature of clear-fellings. The few Sal trees that have been left in these clearings, probably to serve as seed-bearers, are likely to suffer from excessive insolation whereas the chances of their inducing Sal regeneration are precisely nil. How far these fellings are ecologically desirable both for the flora and the fauna is extremely debatable. Floristically they are definitely introducing seral retrogression, and they do appear to have the effect of driving wild life more into the interior due to a lack of cover.

Based on these observations the following ecological subtypes can be distinguished:

TYPE A: A *Shorea robusta*-*Boswellia serrata* association confined to southern aspects, with the *B. serrata* occurring in pure patches on the drier and more exposed slopes. The shrubs here comprise *Nyctanthes arbor-tristis*, *Gardenia* spp., *Colebrookia oppositifolia*. The grass is invariably *H. contortus*. Large shrubs, and even small trees of *Flacourtia ramontchi* are found in this type, particularly near the tops of the ridges. The spines on it are persistent, and give evidence of heavy fellings in the past.

SUB-TYPE A1: Occurring on the Bahimar Road. In this subtype the proportion of *B. serrata* is much reduced. Instead bamboos (*Dendrocalamus strictus*?) and on the higher slopes and ridges

Diospyros spp. are found. There is not much difference in the shrubby growth.

TYPE B: A Sal-*Terminalia* association occurring on the northern slopes and valley bottoms. In this type Sal of a superior quality is found, and the undergrowth is sharply divided. On the Bahimar Road there is a profusion of *Bauhinia vahlii* forming at places dense bushes and *Indigofera pulchella*, an indicator of a good site for Sal. The commonest *Terminalia* was *T. tomentosa* though *T. belerica* and *T. chebula* also occur as isolated trees. On the road from Watch Tower 4 to 5 the undergrowth is *Flemingia chappar*, and *Bauhinia vahlii* does not occur in such profusion.

TYPE C: Along nullahs and perennial streams. Some of the streams have a growth of *E. hyneana* and its associate is usually *Saccharum narenga* (in bloom). In the streams where *E. hyneana* is not found *Saccharum spontaneum* (?) and *S. narenga* occur.

A common feature of all types is the presence of *H. contortus* in varying degrees. Where the canopy is open or has been opened this grass has formed a dense impenetrable mat choking and suppressing all other kinds of vegetation. Sal regeneration is usually absent from all the types, and it is doubtful if any will be established until the canopy is allowed to close and the *H. contortus* wiped out.

A dangerous sign is the stray occurrence of *Lantana* sp. bushes. Since lantana also thrives where the canopy is open, a combination of *Lantana* and *H. contortus* will eventually wipe out every other kind of vegetation. This is all the more reason why fellings in this area should be carried out with great caution so as to avoid permanent gaps in the canopy. Even thinnings should not be heavier than grades B/C. Another danger is that of forest fires. Dry *H. contortus* is as inflammable as tinder, and during the hot weather can catch fire spontaneously. Whilst fire tracing of all view strips and roadside areas is done annually by early burning, it is well known that this is only poor insurance against hot weather fires. Early burning cannot be done beyond March, and after that there is enough time available before the monsoon breaks for the spear grass to grow up again. Forest fires in a National Park are disastrous from every point of view, particularly for the fauna. It may even lead to depletion by driving out the larger animals and ground game. It must be mentioned that during the landlord's ownership forest fires were an annual occurrence in this area. How far the position has improved, if at all, cannot be said as I could not gain access to the fire records of the Forest Department.

All in all the evidence leads to the conclusion that the entire area has been felled over in the past but not according to a properly drawn up working plan or scheme. The growth that is seen now is probably second growth forest. The presence of *Flacourtia ramontchi* in fair numbers confirms this conclusion because this tree is typical of second growth forests recovering from past maltreatment.

6. SAMPLING METHODS

A preliminary reconnaissance of the area made it clear that the best results would be obtained by intensively sampling a percentage of the National Park rather than an overall survey through strips or small sampling units distributed over the entire area. Accordingly an area of more or less 15 square miles (4000 hectares) was selected at random and intensively sampled, i.e. 20% of the total area.

All roads, stream beds, and foot-paths were gone over more than once as also several cross country transects were run between well-defined landmarks or from one road to another or from one foot-path to another. Particular attention was paid to salt licks which showed signs of being in use, as also frequented water holes and drinking places as revealed by footprints and pug marks. Observations were carried out after dark as well, but due to the intense cold these had to be terminated by 9 p.m. After that hour it became physically impossible to stay out of doors. There was a deposit of hoar frost on several nights.

Counting of animals was done both from those actually seen and from footprints and pug marks. Duplication was avoided by not recording footprints observed in the vicinity of any area where any herd of animals had been actually seen. It must, however, be made clear that duplication of numbers in a survey of this nature cannot be eliminated completely, and some allowance has to be made for this fact. No attempt at counting birds was made and in their case information is given as very common, common, frequent, rare, etc. Of course, such birds of which only a few specimens were seen have the number given against them.

7. DISTRIBUTION OF FAUNA BY FOREST TYPES

The maximum concentration of fauna within the area sampled lies in the valley between the Bahimar Road and the opposite hills, through the bottom of which runs an abandoned road. South of this valley the concentration is good though less than within the valley itself. This valley comprises Type B of the ecological sub-types

listed above. In this valley a herd of Spotted Deer (*Axis axis*), Muntjac (*Muntiacus muntjak*) and a Tiger (*Felis tigris*) were observed. Though no Sambar (*Rusa unicolor*) were actually seen yet one herd was identified from its hoof-prints along water courses, as also from damage caused at night to a plantation of Arhar (*Cajanus indicus*) near the staff quarters. I estimate the numbers as spotted deer 10, muntjac 4, tiger 1, and sambar about 6. This area contains the largest numbers of Treepie (*Dendrocitta vagabunda*), Ring Dove (*Streptopelia decaocto*), Whitebellied Drongo (*Dicrurus caerulescens*), and Roseringed Parakeet (*Psittacula krameri*). The streams at the bottom of the valley had a flock of Large Crowned Willow Warbler (*Phylloscopus occipitalis*). 4 Crested Serpent Eagles (*Haematornis cheela*) circle it mostly in their flights and rarely go outside.

In forest Type B on the road from Watch Tower 4 to 5 Nilgai (*Boselaphus tragocamelus*) and Bison (*Bibos gaurus*) exist. The bison number about 4, but the nilgai appear isolated and could not be counted with any degree of accuracy. This area has more Black Partridges (*Francolinus francolinus*) than the other areas.

TYPE A: This type provides the richest bird life and the largest mixed hunting parties. The pure *B. serrata* patches have a party of Rufousbacked Shrike (*Lanius schach nipalensis*), Eastern Orphean Warbler (*Sylvia hortensis*), Grey Shrike (*Lanius excubitor*), Redvented Bulbul (*Pycnonotus cafer*), Magpie Robin (*Copsychus saularis*), Whitebrowed Fantail Flycatcher (*Rhipidura aureola*), Redwhiskered Bulbul (*Pycnonotus jocosus*), and the Large Crowned Willow Warbler (*Phylloscopus occipitalis*). Spotted Deer (*Axis axis*) and Nilgai (*Boselaphus tragocamelus*) are found in this type; as a matter of fact since the forest is more open the number of spotted deer is larger, and I place their numbers at about 20 in this area.

In Type A1 hares (*Lepus ruficaudatus*) and pigs (*Sus cristatus*) occur in larger numbers than in the other type, otherwise it has no special ecological significance.

TYPE C: On the artificial lake behind the dam the only pair of Redwattled Lapwings (*Lobivanellus indicus*) and Common Sandpipers (*Actitis hypoleucos*) were seen. These roost also in the same area. The stream beds generally have a greater abundance of Wagtails (*Motacilla*) and Warblers (*Phylloscopus*).

The road leading from the Forest Rest House to the National Highway has forests falling in types A and B, but the structure of the fauna is rather unique. Along here the only specimens of Crimsonbreasted Barbet (*Megalaima haemacephala*), Stone Chat (*Saxicola caprata*), Verditer Flycatcher (*Muscicapa thalassina*), Blue

Rock Pigeon (*Columba livia*), Blackheaded Shrike (*Lanius schach tricolor*) were seen. A couple of leopards (*Panthera pardus*) were also observed in long grass along a stream bed. Leopards generally are scarce in the National Park.

8. RESULTS

MAMMALS. The mammal population has been estimated by multiplying the number found in the area sampled by 5; since the sampling unit was 1/5th of the total area of the Park. In other words the sampling intensity has been assumed to be 20%. Whilst no mathematical justification can be given for this assumption, yet it was the only basis on which the survey could be carried out. The results are given below:

Species	No. in sampling area	No. in Park	Remarks
1. Common Langur (<i>Semnopithecus entellus</i>)	not seen	not seen	Reported by staff to be present in large numbers near villages.
2. Tiger .. (<i>Felis tigris</i>)	2	10	Staff estimate the number at 15.
3. Leopard .. (<i>Panthera pardus</i>).	2	10	Staff estimate the number at 9.
4. Mongoose .. (<i>Herpestes edwardsii</i>)	4	20	—
5. Jackal .. (<i>Canis aureus</i>)	not seen	not seen	Reported by staff as entering the villages.
6. Fox (<i>Vulpes bengalensis</i>) ..	Frequent	Frequent	Numbers not estimated.
7. Wild Dog .. (<i>Cuon alpinus</i>)	not seen	not seen	Reported by staff as visiting sometimes.
8. Sloth Bear .. (<i>Melursus ursinus</i>)	6	30	Staff estimate the numbers at 25.
9. Palm Squirrel .. (<i>Funambulus pennanti</i>)	2	10	—
10. Common Hare .. (<i>Lepus ruficaudatus</i>)	very common	very common	—
11. Bison .. (<i>Bibos gaurus</i>)	4	20	Appears to be an over estimate. Probably there is only one herd of 4.

Species	No. in sampling area	No. in Park	Remarks
12. Nilgai (<i>Boselaphus tragocamelus</i>) ..	3	15	—
13. Sambar (<i>Rusa unicolor</i>) ..	6	30	—
14. Spotted Deer .. (<i>Axis axis</i>)	30	150	—
15. Muntjac (<i>Muntiacus muntjak</i>) ..	4	20	—
16. Wild Boar .. (<i>Sus cristatus</i>)	common	common	—

A remarkable feature was the complete absence of the Primates. Though the staff reported that the Langur was present in large numbers, not even one was seen by me either in the area sampled or outside. Probably the Lynx (*Caracal caracal*) was seen but as it disappeared very quickly and did not allow me to get close enough, I could not identify it with certainty. It has, however, been reported as present by Mr. N. N. Sen, Chief Conservator of Forests, Rajasthan, who saw a single specimen in December, 1957, vide *J. Bombay nat. Hist. Soc.* (1959) 56 (2): 317.

All the animals are extremely shy and even after five years of protection disappear on the slightest noise. Their fear of man has not been overcome to the smallest extent, and they are as shy and wary as in any forest area where animals are not specially protected. In this connection I received reports that poaching by privileged persons has not been completely stopped. Rather I learnt from a fairly reliable source that a local potentate shot within the Park 6 Spotted Deer in a single night, 2 of which were hinds.

BIRDS. The following birds were seen:

1. Night Heron, *Nycticorax nycticorax*—3. There was a heronry near Watch Tower 5.
2. Whitenecked Stork, *Ciconia episcopus*—1. Probably a straggler.
3. Common Sandpiper, *Actitis hypoleucos*—2. Winter visitor.
4. Redwattled Lapwing, *Lobivanellus indicus*—2.
5. Black Partridge, *Francolinus francolinus*—Frequent.

6. Red Junglefowl, *Gallus gallus*—Common, but very shy.
7. Peafowl, *Pavo cristatus*—1, but staff report it as frequent on the western fringes of the Park.
8. Ring Dove, *Streptopelia decaocto*—Very common.
9. Spotted Dove, *Streptopelia chinensis*—Infrequent.
10. Blue Rock Pigeon, *Columba livia*—4.
11. Crested Serpent Eagle, *Haematornis cheela*—4.
12. Dusky Horned Owl, *Bubo coromandus*—Common.
13. Mottled Wood Owl, *Strix ocellata*—1.
14. Common Indian Nightjar, *Caprimulgus asiaticus*—Common.
15. Whiterumped Spinetail, *Indicapus sylvaticus*—A flock of about 6.
16. Whitebreasted Kingfisher, *Halcyon smyrnensis*—Frequent.
17. Common Kingfisher, *Alcedo atthis*—Frequent.
18. Green Bee-eater, *Merops orientalis*—4.
19. Indian Roller, *Coracias benghalensis*—one pair.
20. Roseringed Parakeet, *Psittacula krameri*—Very common.
21. Large Indian Parakeet, *Psittacula eupatria*—Frequent.
22. Crimsonbreasted Barbet, *Megalaima haemacephala*—Common.
23. Green Barbet, *Megalaima zeylanica*—Frequent.
24. Goldenbacked Woodpecker, *Dinopium benghalense*—Common.
25. Pigmy Woodpecker, *Dendrocopos nanus*—Frequent.
26. Mahratta Woodpecker, *Dendrocopos mahrattensis*—Common.
27. Tickell's Flowerpecker, *Dicaeum erythrorhynchos*—Frequent.
28. Purple Sunbird, *Nectarinia asiatica*—Very common.
29. Eastern Grey Wagtail, *Motacilla caspica*—Frequent. Winter visitor.
30. Whitefaced Wagtail, *Motacilla alba leucopsis*—Frequent. Winter visitor.
31. Common Swallow, *Hirundo rustica*—A flock of about 9. Winter visitor.
32. Common Myna, *Sturnus tristis*—One pair, probably stragglers.
33. Golden Oriole, *Oriolus oriolus (kundo)*—Frequent.
34. Jungle Wren Warbler, *Prinia sylvatica*—Common.
35. Large Crowned Willow Warbler, *Phylloscopus occipitalis*—Frequent. Winter visitor.
36. Green Willow Warbler, *Phylloscopus trochiloides*—Frequent. Winter visitor.
37. Eastern Orphean Warbler, *Sylvia hortensis*—Rare. Winter visitor.

38. Tailor Bird, *Orthotomus sutorius*—Common.
39. Whitebellied Drongo, *Dicrurus caeruleus*—Very common.
40. Black Drongo, *Dicrurus macrocercus*—Rare.
41. Small Minivet, *Pericrocotus cinnamomeus*—Common.
42. Blackbacked Pied Shrike, *Hemipus picatus*—Frequent.
43. Rufousbacked Shrike, *Lanius schach nipalensis*—Frequent.
44. Blackheaded Shrike, *Lanius schach tricolor*—Frequent.
45. Grey Shrike, *Lanius excubitor*—Frequent.
46. Whitebrowed Fantail Flycatcher, *Rhipidura aureola*—Common.
47. Verditer Flycatcher, *Muscicapa thalassina*—1. Winter visitor.
48. Tickell's Blue Flycatcher, *Muscicapa tickelliae*—Common.
49. Redbreasted Flycatcher, *Muscicapa parva*—Common. Winter visitor.
50. Magpie Robin, *Copsychus saularis*—One pair.
51. Indian Robin, *Saxicoloides fulicata*—Common.
52. Stone Chat, *Saxicola caprata*—Frequent.
53. Redwhiskered Bulbul, *Pycnonotus jocosus*—Rare.
54. Redvented Bulbul, *Pycnonotus cafer*—Very common.
55. Goldfronted Chloropsis, *Chloropsis aurifrons*—Common.
56. Common Iora, *Aegithina tiphia*—Common.
57. Yelloweyed Babbler, *Chrysomma sinensis*—Common.
58. Jungle Babbler, *Turdoides somervillei*—Very common.
59. Treepie, *Dendrocitta vagabunda*—Very common.
60. Jungle Crow, *Corvus macrorhynchos*—Common.

The following mixed hunting party invariably gathered in a small area between the Forest Rest House and the Tourist Lodge, both in the morning and the evening. It almost seemed as if this party assembled in the morning just before dispersing and again in the evening just before roosting.

Treepies, Redvented Bulbuls, Jungle Babblers, Redbreasted Flycatchers, Crimsonbreasted Barbets, Ioras, Whitefaced Wagtails, Eastern Grey Wagtails, Common and Whitebreasted Kingfishers, Jungle Crows, Common Mynas, Tailor Birds, Goldfronted Chloropses, Goldenbacked and Mahratta Woodpeckers, and Indian Robins. The entire party had a strength of from 70 to 80 birds.

The above list shows that bird life is poorly represented. As against only 60 species as many as 108 were recorded in the Kodarma Sanctuary lying only some 35 miles to the north. That too in a survey that was very sketchy compared to the intensity of the present one. The absence of game birds of all kinds, particularly Grey Partridge, Spurfowl, and Quail, is noticeable. I saw only one peafowl

which is surprising. Even common birds like egrets, kites, hornbills, and practically all the birds of prey are missing. Except for a pair of Common Mynas, which too showed signs of having strayed in, no members of the genus *Sturnus* were recorded. Even a very common bird like the Pied Myna was absent.

The place of the Black Drongo has been taken here by the Whitebellied Drongo. I saw only 2 pairs of Black Drongos, whereas the Whitebellied ones were very plentiful. Again the Spotted Dove appears to have been supplanted by the Ring Dove. In spite of the area being very well watered waders were absent.

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